Notice of Allowability	Application No.	Applicant(s)	
	10/803,023	RATTNER ET AL.	
	Examiner	Art Unit	
	JUDE J. JEAN GILLES	2443	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/02/2008*.

2. ☒ The allowed claim(s) is/are *1,2,6-12,14-22 and 24*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *02/19/2009* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Jude J Jean-Gilles/
Primary Examiner, Art Unit 2443

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Applicants' attorney, Robert P. Lord; reg. No. 46,479 on 02/19/2009.

Title

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: -- IMPLEMENTATION OF AFFINITIES IN HIGH AVAILABILITY CLUSTERS IN A COMPUTER SYSTEM--.

Amendment to the claims

3. Please cancel claims 3-5, 13, and 23 without prejudice or disclaimer.

4. Please amend claims 1, 16, and 21 and their dependencies as follows:

1. (Currently amended) A system comprising:

a cluster having a plurality of nodes, wherein each of the plurality of nodes is a computer system comprising hardware and software configured to execute on the hardware, wherein the software is stored on the hardware, and wherein at least one of the nodes is a candidate node;

a plurality of resource groups;

a clustering mechanism executing on the cluster configured to activate a first resource group of the plurality of resource groups on the candidate node; and

a resource group affinity of the plurality of resource groups, wherein the resource group affinity comprises:

a unidirectional association between the first resource group of the plurality of resource groups and a second resource group of the plurality of resource groups,

an affinity type for defining the resource group affinity of the first resource group to the second resource group, wherein the affinity type is one selected from [[the]] a group consisting of a positive affinity type and a negative affinity type, wherein the positive affinity type indicates that the clustering mechanism should attempt to activate the first resource group on a same node as the second resource group, and wherein the negative affinity type indicates that the clustering mechanism should attempt to activate the first resource group on a different node than the second resource group, and

an affinity strength defining a degree of the affinity type of the resource group affinity, wherein the affinity strength is one selected from the group consisting of a strong affinity strength, a weak affinity strength, and a mutual strong affinity strength.

2. (Original) The system of claim 1, wherein the plurality of resource groups comprises:

a plurality of resources configured to provide at least one service; and

a monitor configured to observe the activity of the at least one service.

3. (Cancelled)

4. (Cancelled)

5. (Cancelled)

6. (Currently Amended) The system of claim 1, wherein the first resource group is activated on [[a]] the same node as the second resource group when the resource group affinity comprises one selected from [[a]] the strong affinity strength and the mutual strong affinity strength and [[a]] the positive affinity type.

7. (Original) The system of claim 6, wherein the first resource group follows the second resource group if the second resource group changes nodes or goes offline.

8. (Currently Amended) The system of claim 1, wherein the first resource group is activated on [[a]] the different node than the second resource group when the resource group affinity comprises [[a]] the strong affinity strength and [[a]] the negative affinity type.

9. (Original) The system of claim 8, wherein the first resource group relocates to another node if the second resource group moves to the same node as the first resource group.

10. (Currently Amended) The system of claim 1, wherein the first resource group may be activated on [[a]] the same node as the second resource group when the resource group affinity comprises [[a]] the weak affinity strength and [[a]] the positive affinity type,

but if an attempt fails, the first resource group may be activated on [[a]] the different node than the second resource group.

11. (Currently Amended) The system of claim 1, wherein the first resource group may be activated on [[a]] the different node than the second resource group when the resource group affinity comprises [[a]] the weak affinity strength and [[a]] the negative affinity type, but if an attempt fails, the first resource group may be activated on [[a]] the same node as the second resource group.

12. (Currently Amended) The system of claim 1, wherein the first resource group is activated on [[a]] the same node as the second resource group and the first resource group is able to move the second resource group to [[a]] the different node when the resource group affinity comprises [[a]] the mutual strong affinity strength and [[a]] the positive affinity type.

13. (Cancelled)

14. (Original) The system of claim 1, wherein a least constrained resource group of the plurality of resources groups is activated prior to more constrained resource groups.

15. (Original) The system of claim 14, wherein a first of the plurality of resource groups has no strong affinities for any other resource group and a second of the plurality of resource groups has no strong affinities for any resource group that follows the second of the plurality of resource groups.

16. (Currently Amended) A method to activate a first resource group comprising:

determining a plurality of candidate nodes for the first resource group, wherein each of the plurality of candidate nodes is a computer system;

eliminating any of the plurality of candidate nodes that violates a strong affinity of the first resource group, to generate a plurality of affinity candidate nodes, wherein the plurality of candidate nodes are eliminated based on a negative affinity type of a resource group affinity of the first resource group to a second resource group, wherein the negative affinity type and a strong affinity indicate that the first resource group must be activated on a different node than the second resource group;

determining a composite value for each of the plurality of affinity candidate nodes;

sorting the plurality of affinity candidate nodes based on a pre-defined priority using the composite values to obtain a sorted list;

determining a number of resource groups that are removed from one of the plurality of affinity candidate nodes when the first resource group is activated on the one of the plurality of candidate nodes;

calculating the net number of outgoing weak affinities satisfied when the first resource group is activated on the one of the plurality of candidate nodes;

calculating the net number of incoming weak affinities satisfied when the first resource group is activated on the one of the plurality of candidate nodes; and

determining an ordinal position of the one of the plurality of candidate nodes in the first resource group.

17. (Previously Presented) The method of claim 16, further comprising:

activating the first resource group on at least one of the plurality of affinity candidate nodes based on the sorted list.

18. (Previously Presented) The method of claim 16, wherein determining the composite value further comprises:

determining a number of resource groups that are removed from one of the plurality of affinity candidate nodes when the first resource group is activated on the one of the plurality of candidate nodes;

calculating the net number of outgoing weak affinities satisfied when the first resource group is activated on the one of the plurality of candidate nodes;

calculating the net number of incoming weak affinities satisfied when the first resource group is activated on the one of the plurality of candidate nodes; and

determining an ordinal position of the one of the plurality of candidate nodes in the first resource group's nodelist property.

19. (Original) The method of claim 18, wherein the resource groups that are removed comprise a strong affinity for the first resource group.

20. (Original) The method of claim 18, wherein a first priority of the pre-defined priority is placed on maximizing the net number of outgoing weak affinities satisfied, a second priority is placed on minimizing the number of resource groups removed from one of the plurality of candidate nodes, a third priority is placed on maximizing the net number of incoming weak affinities satisfied, and a fourth priority is placed on the ordinal position of the affinity candidate node in the nodelist property.

21. (Currently Amended) A computer system for activating resource groups, comprising:

a processor;

a memory;

a storage device; and

software instructions stored in the memory for enabling the computer system under control of the processor to:

determine a plurality of candidate nodes for the first resource group, wherein each ofthe plurality of candidate nodes is a separate computer system;

eliminate any of the plurality of candidate nodes that violates a strong affinity of the first resource group to generate a plurality of affinity candidate nodes, wherein the plurality of candidate nodes are eliminated based on a negative affinity type of a resource group affinity of the first resource group to a second resource group, wherein the negative affinity type and a strong affinity indicates that the first resource group must be activated on a different node than the second resource group;

determine a composite value for each of the plurality of affinity candidate nodes;

sort the plurality of affinity candidate nodes based on a pre-defined priority using the composite values to obtain a sorted list;

determine a number of resource groups that are removed from one of the plurality of affinity candidate nodes when the first resource group is activated on the one of the plurality of candidate nodes;

calculate the net number of outgoing weak affinities satisfied when the first resource group is activated on the one of the plurality of candidate nodes;

calculate the net number of incoming weak affinities satisfied when the first resource group is activated on the one of the plurality of candidate nodes; and

determine an ordinal position of the one of the plurality of candidate nodes in the first resource group.

22. (Original) The system of claim 21, further comprising:

software instructions stored in the memory for enabling the computer system under control of the processor to activate the first resource group on at least one of the plurality of affinity candidate nodes based on the sorted list.

23. (Cancelled)

24. (Previously Presented) The system of claim 21, wherein a first priority of the pre-defined priority is placed on maximizing the net number of outgoing weak affinities satisfied, a second priority is placed on minimizing the number of resource groups removed from one of the plurality of candidate nodes, a third priority is placed on maximizing the net number of incoming weak affinities satisfied, and a fourth priority is placed on the ordinal position of the affinity candidate node in the nodelist property.

Reasons for Allowance

5. The following is an examiner's statement of reasons for allowance: the closest prior art of record (Krishnamurphy et al., U.S. Pub. No. 20030135724 A1) does not teach nor suggest in detail a computer system wherein "a resource group affinity of the plurality of resource groups, wherein the resource group affinity with a unidirectional

association between the first resource group of the plurality of resource groups and a second resource group of the plurality of resource groups, an affinity type for defining the resource group affinity of the first resource group to the second resource group, wherein the affinity type is one selected from a group consisting of a positive affinity type and a negative affinity type, wherein the positive affinity type indicates that the clustering mechanism should attempt to activate the first resource group on a same node as the second resource group, and wherein the negative affinity type indicates that the clustering mechanism should attempt to activate the first resource group on a different node than the second resource group, and an affinity strength defining a degree of the affinity type of the resource group affinity, wherein the affinity strength is one selected from the group consisting of a strong affinity strength, a weak affinity strength, and a mutual strong affinity strength" in combination with all the elements of each independent claim. Applicants argument during the interview dated 02/19/2008, as well as the enabling portions of Applicant's specification, paragraphs [0001], [0022], and [0023]) support the claim amendments as submitted.

The dependent claims further limit the independent claims and are considered allowable on the same basis as the independent claims as well as for the further limitations set forth.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

6. **Claims 1, 2, 6-12, 14-22, and 24** are allowed. Renumbered 1-15.

Conclusion

7. Any inquiry concerning this communication or earlier communications from examiner should be directed to Jude Jean-Gilles whose telephone number is (571) 272-3914. The examiner can normally be reached on Monday- Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tonia Dollinger, can be reached on (571) 272-4170. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-3301.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-0800.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jude J Jean-Gilles/

Primary Examiner, Art Unit 2443

February 26, 2009